

CLAIMS

1. A separator plate for a polymer electrolyte fuel cell comprising: an electronic conductor portion containing conductive carbon; and an insulating portion surrounding said electronic conductor portion, said electronic conductor portion having a first flow channel of a gas or cooling water on one side and having a second flow channel of a gas or cooling water on the other side.

2. The separator plate for a polymer electrolyte fuel cell in accordance with claim 1, wherein said electronic conductor portion and said insulating portion are molded integrally, and said insulating portion has a pair of first manifold apertures communicating with said first flow channel and a pair of second manifold apertures communicating with said second flow channel.

3. The separator plate for a polymer electrolyte fuel cell in accordance with claim 1, further comprising a third portion between said electronic conductor portion and said insulating portion.

4. The separator plate for a polymer electrolyte fuel cell in accordance with claim 3, wherein said third portion comprises an adhesive material.

5. The separator plate for a polymer electrolyte fuel cell in accordance with claim 3, wherein said third portion comprises a mixture of a material used in said electronic conductor portion and a material used in said

insulating portion.

6. The separator plate for a polymer electrolyte fuel cell in accordance with claim 1, wherein said electronic conductor portion and said insulating portion are injection molded.

7. The separator plate for a polymer electrolyte fuel cell in accordance with claim 1, wherein said electronic conductor portion comprises a mixture of an inorganic conductive filler and a resin.

8. The separator plate for a polymer electrolyte fuel cell in accordance with claim 1, wherein said insulating portion comprises a gas-tight elastic material.

9. The separator plate for a polymer electrolyte fuel cell in accordance with claim 1, wherein said insulating portion comprises a thermoplastic resin.

10. The separator plate for a polymer electrolyte fuel cell in accordance with claim 1, wherein said electronic conductor portion and said insulating portion comprise a resin having the same main molecular structure.

11. The separator plate for a polymer electrolyte fuel cell in accordance with claim 10, wherein said resin having the same main molecular structure is polyphenylene sulfide.

12. The separator plate for a polymer electrolyte fuel cell in accordance with claim 1, wherein the joint between said electronic conductor portion and said insulating

portion has a cross-section which comprises a combination of a projection and a depression.

13. The separator plate for a polymer electrolyte fuel cell in accordance with claim 12, wherein said projection is formed on said electronic conductor portion.

14. The separator plate for a polymer electrolyte fuel cell in accordance with claim 1, wherein the electronic conductor portion and the insulating portion are joined by inserting one of the electronic conductor portion and the insulating portion into a hole formed in the other portion.

15. The separator plate for a polymer electrolyte fuel cell in accordance with claim 14, wherein said hole is formed in said electronic conductor portion.

16. A polymer electrolyte fuel cell comprising a cell stack, said cell stack including: a plurality of membrane electrode assemblies, each comprising a hydrogen-ion conductive polymer electrolyte membrane and an anode and a cathode sandwiching said electrolyte membrane; and a plurality of the separator plates that are stacked alternately with said membrane electrode assemblies,

wherein each of said separator plates comprises: an electronic conductor portion containing conductive carbon; and an insulating portion surrounding said electronic conductor portion, and

said electronic conductor portion has a first flow channel of a gas or cooling water on one side and has a second

flow channel of a gas or cooling water on the other side.